| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 08/464,034 | HYATT, GILBERT P. | |
| | Examiner | Art Unit | |
| | Brian P. Werner | 2621 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *25 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *see action paragraph 1* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *all pending* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *attached*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Responsive to Amendments & Submissions*

1. This Office Action is responsive to the following submissions:

- The arguments received on December 10, 2002 (paper number 51)
- Amendment J, received on July 25, 2003 (paper number 55).

Taking into consideration the above amendment, the following claims are currently pending: 98-102, 105-173, 187-281, 284, 285, 301, and 380-583.

### *Information Disclosure Statement*

2. The previously submitted information disclosure statement(s) attached hereto have been considered, and singed/initialed copies are provided herewith. The US Patent references cited thereon, while not provided with the IDS's, have each been fully considered because the examiner has immediate access to them. However, the non-patent literature has NOT been considered, because these documents have not been provided with the IDS's and the examiner does NOT have access to them. Therefore, the non-patent literature documents cited on each IDS under consideration have been marked with "N/A" (not available) and "N/C" (not considered).

3. On April 26, 2004, an IDS apparently citing all of the previously non-considered art was filed along with copies of the references. This IDS has been considered, and a signed/initialed copy is provided herewith. The full consideration of this IDS presumably serves to remedy the non-consideration of the previous art.

### *Drawings*

4. The drawings are objected to under 37 CFR 1.83(a) as not showing every feature of the invention specified in the claims. That is, the drawings fail to show the claimed interconnections and interrelations between the individual claim elements as described in the 35 USC 112, first paragraph rejections below. **New matter should not be entered.**

### *Claim Objections*

5. The following quotations of 37 CFR § 1.75(d)(1) is the basis of objection:

> (d)(1) The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description. (See § 1.58(a)).

6. All of the pending claims are objected to under 37 CFR § 1.75(d)(1) as failing to conform to the invention as set forth in the remainder of the specification. The specification does not describe each and every element of the claimed invention, along with the claimed interconnections (e.g., the "coupled to" language) and the interrelation

(e.g., the "in response to" language) as described in the 35 USC 112, first paragraph "written description" rejections below. **New matter should not be entered.**

### *Claim Rejections - 35 USC § 112*

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

### The Written Description Requirement

8. The aforementioned currently pending claims are all rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contain subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. An explanation shall follow.

Background and Legal Basis

The examiner has relied upon MPEP chapter 2163, The Written Description Requirement, as well as the Guidelines for Examiner of Patent Applications Under the 35 U.S.C. 112, ¶1, "Written Description" Requirement, published in the Federal Register, Vol. 66. No. 4, Friday, January 5, 2001 (referred to herein as the "Guidelines"). According to the MPEP and the Guidelines:

- The written description requirement of 35 U.S.C. 112 has several policy objectives including the conveyance of information that an applicant "has invented the subject matter which is claimed", and to put the public in possession of what the applicant claims as the invention.
- The written description requirement is satisfied when a patent "specification" describes the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention.
- To show possession, the specification must describe the claimed invention with all of its limitations using words, structures, figures, diagrams and formulas that full set forth the claimed invention.
- The written description requirement prevents an applicant from claiming subject matter that was not adequately described in the specification as filed.

The original disclosure, comprising the originally filed specification, claims and drawings, is the sole basis for the written description support of claimed subject matter. Possession of a claimed invention, and particularly a claimed invention added after the original filing date (such as the applicant's pending claims), is satisfied when the specification describes the claimed invention with all of its limitations using words, structures, figures, diagrams and formulas. It is not enough for a specification to mention the individual claim elements in disparate sections in the absence of a disclosed relationship with each other commensurate with the claimed invention. There must be at least one self-contained embodiment in the original disclosure that describes the claimed invention, including all of its elements and the interrelations between the elements.

The Applicant's Claim Invention(s) Lacks Written Description Support

Each pending claim recites a combination of individual claimed elements, where the elements are modified by their interrelations (e.g., the "in response to" language). That is, each pending claim as a whole (i.e., the claimed combination) defines a system whereby the claimed elements interact very specifically with one another according to the claimed interrelations. **The claimed elements are inextricably linked to each other by the claimed interrelations, thereby defining a symbiotic system of elements.**

Upon a thorough analysis of each claim based upon the criteria set forth in the MPEP and the Guidelines, the examiner has concluded that the applicant's original disclosure fails to provide written description support for the pending claims; all of which were added well after the original filing date. In order to explain the examiner's analysis, an example claim shall be presented, followed by an explanation of the original disclosure inasmuch as it supports that claim. In addition, a brief explanation of the applicant's "product" claims shall be provided.

Example Claim

**Claim 554 (as presented in amendment J, received on July 25, 2003)** shall be used to exemplify how the claimed combination of elements, along with the claimed interrelations between the elements is not supported (i.e., written description support) by the original disclosure. While one claim is exemplified here, ALL of the pending

claims have been examined using the same analysis, and NONE have been found to possess adequate written description support.

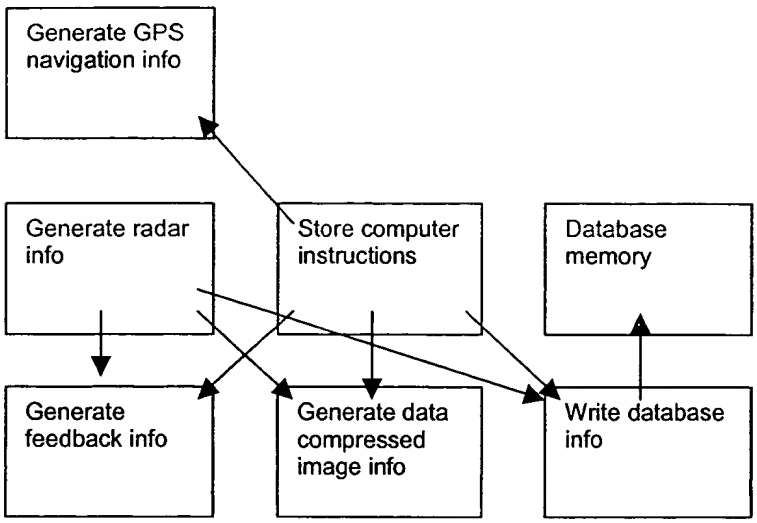
Original Claims

All of the original claims have been cancelled, and there are no pending claims that are identical or equivalent to any of the originally filed claims. All of the pending claims have been added by amendment well after the effective filing date of the application. **Thus, the original claims do not provide a written description for the example claim; or for any of the other pending claims.**

The Drawings

The originally filed drawings FAIL TO DEPICT the combination of individual elements recited in the example claim per se, LET ALONE their interconnections and interrelations. In order to provide support for the example claim, the drawings must depict the individual elements and their interrelations. Such a depiction, even in a most rudimentary form, is completely lacking from the applicant's drawings.

To begin with, and regarding the example claim, the examiner has diagramed the claimed elements along with their interrelations in figure A below. The individual elements are depicted as boxes, and the interrelations are depicted as arrows spanning the boxes (i.e., not unlike the applicant's block diagram format; e.g., figure 1A).

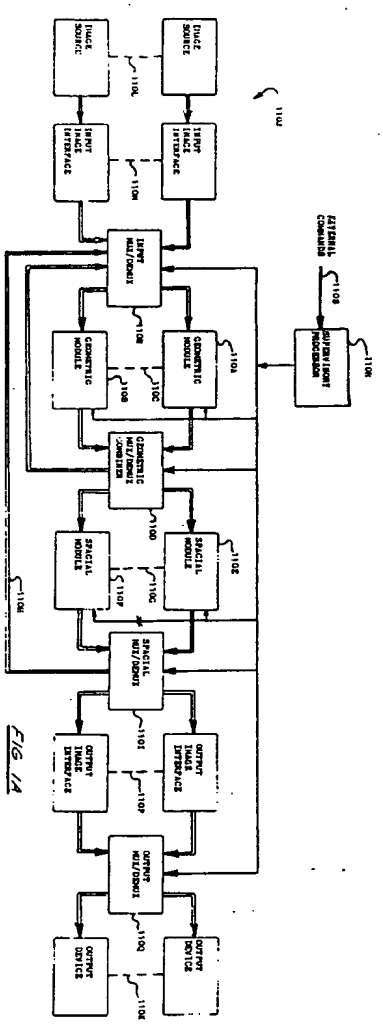



**Office Action Figure A – Diagram of the Example Claim**

There are no drawings that even remotely depict such a system. Neither the combination individual elements nor the interrelations between the elements are depicted anywhere. For example, according to the original specification, applicant's figures 1A and 1C depict the disclosed invention in block diagram form. That is, page 5 of the applicant's specification page describes these figures as follows:

> "Fig 1A is a block diagram representation of one configuration of the system of the present invention" and
>
> "Fig IC is a block diagram of a single channel configuration of one configuration of the present invention in accordance with a reduced implementation of Fig IA"

However, neither of these figures (or any of the other figures) depicts the *combination of elements* or the *interrelations between the elements* of the example claim as diagramed by the examiner above. For example, the applicant's figure 1A appears as follows:



**Office Action Figure A1 – Applicant's Figure 1A**

However, the applicant's figure 1A is merely a generalized, non-specific block diagram of a "system" that in no way depicts the combination of specific claimed elements, let alone the specific interrelations defined by the example claim. For

example, where in the applicant's figure 1A are the individual elements of the example claim (i.e., refer to the Office Action figure A above)? Further, where are the interrelations between the individual elements depicted? Where in the applicant's figure 1A, 1C or in any other figure is a depiction the aforementioned *combination of elements*, let alone the aforementioned *interrelations between the elements*? Upon a thorough examination of each and every figure of the applicant's original disclosure, such a figure cannot be found.

The examiner recognizes that the drawings are meant to accompany and complement the written description of the invention as provided by the specification. However, the specification fails to remedy the drawing deficiencies as described immediately below.

The Specification

While SOME of the individual claimed elements and terms do appear scattered throughout disparate sections of the original specification, the specification fails to describe a complete system (e.g., a self-contained embodiment) corresponding to the aforementioned *combination of elements,* let alone the aforementioned *interrelations between the elements* commensurate with the example claim.

For example, "radar" subject matter is only mentioned in a few instances in the specification (outside of the table of contents), as follows (in part, with emphasis added):

> "Input device 132A may be a data acquisition system such as a **radar**, sonar, video, or other system for acquiring an image; a database memory; or other input device" At page 49.

"Input signals 132M may be scan-related signals; such as raster scan signals for a video input, PPI or polar coordinate scan signals for sonar and **radar** systems, or other scan-related signals" at page 50.

"For example, input memory 132B may store a large map of an environment (either sonar, **radar**, video, or otherwise) and output memory 132D may store a portion of the environment pertinent to the operation in progress, such as the portion of the environment around a vehicle being navigated" at page 57.

"The filtering teachings herein are generally applicable, such as for spatial and temporal filtering of **radar**, seismic, and sonar systems; kernel processing of information; multiplier and sum of the products architectures for computations; table processing as with the weight table architecture; and latching of multiple parameters in multi-parameter registers for parallel processing" at page 64.

"For example, an input data stream can be generated from a digitized input; such as from a camera, sonar receiver, or **radar** receiver; and can be scanned into image memory with geometric preprocessing" at page 70.

"Navigation information can include GPS, inertial, celestial, **radar**, Tercom, dead-reckoning, and other navigation information. Sensor information can include **radar**, infra-red, video, sonar, and other sensor information" at page 387.

"Such a map display can have superimposed overlays, such as topographical overlays for terrain and **radar** overlays for registering of radar images with terrain map images" at page 441.

"For example, a video camera in the RPV can provide video images, a **radar** system in the RPV can provide **radar** images, a side-looking **radar** (SLR) in the RPV can provide SLR images, a forward-looking infrared (FLIR) system in the RPV can provide FLIR images, and other sensors in the RPV can provide other images" at page 455.

First, it is noted the claimed elements of "GPS" and "radar" are indeed used together in this passage; this being the only passage where the two are ever discussed

together. However, the passage is silent about any interrelations between the two; particularly the interrelation recited in the example claim.

Second, the term "radar" is exemplary in nature, and is merely mentioned as an "example" of navigation or image information that "can be" used, rather than as part of description of self-contained working embodiment. However, a mere mention that one "can" use radar navigation information (for some undisclosed purpose) is not enough to provide evidence of possession of the example claim. There is certainly no mention in the specification of a nexus between the radar information and the remaining individual elements of the example claim, let alone their claimed interrelations (i.e., as depicted in the examiner's figure A above). There is no explicit, implicit, or inherent teaching in the original disclosure of combining these disparate claim elements in a single, interconnected and interrelated system in the manner claimed. There are no single, self-contained embodiments of the original disclosure that integrate these disparate claimed elements, having the claimed interconnections and interrelations.

**In summary, the originally filed disclosure does not explicitly, implicitly, or inherently describe or otherwise suggest the claimed combinations as a whole, including all of the claimed interconnections and interrelations. There are no single, self-contained embodiments within specification that correspond to the currently pending claimed combinations.**

"GPS" subject matter is only mentioned in one paragraph in the specification, at page 387, which states (emphasis added):

> "In a military application; overlays can be related to fire control, bombing, sensors, and navigation. Navigation information can include **GPS**, inertial, celestial, **radar**, Tercom, dead reckoning, and other navigation information. Sensor information can include radar, infra red, video, sonar, and other sensor information."

The term "GPS" is exemplary in nature, and is merely mentioned as an example of navigation information that "can be" used, rather than as part of description of self-contained working embodiment. However, a mere mention that one "can" use GPS navigation information (for some undisclosed purpose) is not enough to provide evidence of possession of the example claim. There is certainly no mention in the specification of a nexus between the GPS information and the remaining individual elements of the example claim, let alone their claimed interrelations (i.e., as depicted in the examiner's figure A above). There is no explicit, implicit, or inherent teaching in the original disclosure of combining these disparate claim elements in a single, interconnected and interrelated system in the manner claimed. There are no single, self-contained embodiments of the original disclosure that integrate these disparate claimed elements, having the claimed interconnections and interrelations.

**In summary, the originally filed disclosure does not explicitly, implicitly, or inherently describe or otherwise suggest the claimed combinations as a whole, including all of the claimed interconnections and interrelations. There are no single, self-contained embodiments within specification that correspond to the currently pending claimed combinations.**

PRODUCT CLAIMS

Many claims recite limitations for making a generalized, and even a specific "product". For example, claim 111 recites (with emphasis added):

> "A process as set forth in claim 109, further comprising the act of making a DVD product."

However, there is no written description support in the original disclosure of making a product, either alone or in response to anything. Certainly, there is not even a mention of a "DVD product". Using the same detailed analysis of example claim above, the Examiner has concluded that there is simply no description in the specification, original claims or in any depiction in the drawings of the claimed "products" per se, let alone the act of making these claimed products, and let alone making the products "in response to" the limitations of another claims.

A review of the specification reveals that, with one exception, variations of the term product is used in the specification only in a mathematical sense (such as for multiplication or a sum-of-products). For example, page 64 of the specification states (emphasis added):

> "The filtering teachings herein are generally applicable, such as for spatial and temporal filtering of radar, seismic, and sonar systems; kernel processing of information; multiplier and sum of the **products** architectures for computations; table processing as with the weight table architecture; and latching of multiple parameters in multi-parameter registers for parallel processing."

The only other reference to a product is on page 454 which recites (emphasis added):

> "[A]lthough the final **product** of a graphic art system may be static photographs, real time operation permits an operator to efficiently and rapidly configure images."

While this one sentence appears to be discussing a photograph as being a product of a graphic arts system, this is nothing more than an axiomatic statement. Furthermore, this statement does not provide written description support for the aforementioned specifically claimed product.

In summary, the specification fails to provide written description support for the "product" claim exemplified above, or for any of the other claimed products.

Summary

In order to demonstrate a lack of written description, the examiner is faced with the task of proving a negative. That is, the examiner must show that the claimed subject matter is NOT present in the specification. In the case of the example claim above (and for every other claim), the elements recited therein along with their interrelations are not described by the original claims, they are not depicted in the originally filed drawings, and they are not described by the words of the specification. **Therefore, the examiner must conclude that, according to the relevant law (i.e., as described by the MPEP as well as the Guidelines), the applicant did not invent the subject matter that is now claimed, and one of ordinary skill could not reasonably**

**conclude that he was in possession of the claimed invention(s) at the time the application was filed.** Furthermore, to date the applicant has made absolutely no attempt to show possession of the claimed invention; despite the filing of numerous lengthy responses that generally cite case law, and specifically allege that the examiner has not made a prima facie case.

Proper Traversal of the Written Description Rejection

Traversal of the written description rejection is simple. According to the MPEP and the Guidelines as summarized above, the written description requirement is satisfied when a patent "specification" describes the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. In order to show possession, the specification must describe the claimed invention with all of its limitations using words, structures, figures, diagrams and formulas that full set forth the claimed invention. **Therefore, to show possession, the applicant need only point to a single, self-contained embodiment of the specification that discloses the entire claimed invention, including all of the elements and interrelations between the elements, using words, structures, figures, diagrams and formulas.** Thus far in the prosecution history, the applicant has made no attempt to do so.

Appeal Decisions in Related Copending Applications

The Board of Patent Appeals and Interferences has rendered appeal decisions in the following related and copending applications: 08/471,633; 08/465,072; and 08/461,567. These applications have an identical original disclosure to that of the instant application, and were rejected by the examiner as lacking a written description. The manner in which the written description rejections were advanced by the examiner is equivalent to the rejections advanced herein. In all three decisions, the Board AFFIRMED the examiner on Written Description, stating that (for example),

> **"Based upon such deficiencies in the written description, we find that the examiner had a reasonable basis for questioning the written description for each of the rejected claims on appeal, and the burden of proof thereafter shifted to appellant" (Decision for S/N 08/471,633, page 8).**

Based on these decisions, and the similarities of the applications and issues, it is the examiner's contention that the burden has now shifted to the applicant to show written description support for the claims at issue herein.

**The Enablement Requirement**

9. The aforementioned currently pending claims are all rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure fails to provide the

necessary guidance required for one skilled in the art to make and use the claimed invention without undue or unreasonable experimentation. An explanation and presentation of evidence shall follow.

Organization of the Rejection:

The rejection shall be presented in the following sections:

- Enablement distinguished from Written Description
- The "effective filing date" of the Application
- The Initial Burden is on the Examiner
- The Disclosed Invention: Specific Architecture under Software Control.
- Example Claim
- The Non-Enabled Subject Matter
- The *In re Wands* Test and Proof of the State of the Art
- Software Burden at the Time of the Invention
- *In re Ghiron and Ulrich*
- *In re Scarbrough*
- *In re Gunn*
- *In re Wright*
- Invitation to Experiment Extensively: Applicant's Experimental System
- Non-Enabled as of Most Recent Filing

- Summary
- The Burden has Shifted to the Applicant

Enablement Distinguished from Written Description

The enablement rejection presented herein is NOT based on and does NOT depend upon the written description rejection in any manner. Rather, an explanation shall be provided and evidence presented that the original disclosure has such serious deficiencies that, given the state of the art, would have required one skilled in the art an undue amount of experimentation to make and use the now claimed invention.

The "effective filing date" of the Application

The effective US filing date of the instant application is October 19, 1984. This date is considered by law to be the date of constructive reduction to practice in determining priority of the invention[1], and is significant with respect to the instant enablement rejections for at least two reasons (support for these assertions is provided in Appendix A):

- Any evidence in the form of prior art entered into the record, either by the examiner or by the applicant, in order to prove the state of the art at the time of the invention must have been published before this date.

[1] *In re Glass* decision 181 USPQ 31, 35 (CCPA 1974).

- The specification disclosure must provide enabling support for the claimed subject matter as of this date.

Accordingly, all prior art evidence presented by the examiner below and used to demonstrate the state of the art was published before the "effective filing date" of the application. Further, while the examiner shall present evidence that the specification lacked enablement as of the effective US filing date, it will also be shown that the specification lacked enablement as of the most recent filing of a continuation in June of 1995.

The Initial Burden is on the Examiner

"When rejecting a claim under the enablement requirement of section 112, the PTO bears an initial burden of setting forth a reasonable explanation as to why it believes that the scope of protection provided by the claim is not adequately enabled by the description of the invention provided in the specification of the application; this includes, of course, providing sufficient reasons for doubting any assertions in the specification as to the scope of enablement." In re Wright, 27 USPQ2d 1510, 1513. In the rejection to follow, the examiner shall explain why he believes the claims are not enabled by **"the description of the invention provided in the specification"**. The examiner's reasons are NOT merely an unsupported allegation based on intuition and/or engineering experience. Rather, evidence in the form of US patents, non-patent

literature and case law are relied upon and explained in support of the examiner's assertions, and the pertinent *In re Wands* factors are considered.

The Disclosed Invention: Specific Architecture under Software "Configuration"

The disclosure lacks enablement due to deficiencies that are so severe, one skilled in the art would require undue experimentation to make and use the invention. A brief overview of the disclosed invention shall be provided as the foundation for the enablement rejection to follow; where the nature of the deficiencies will be described in detail, and evidence shall be presented regarding "undue experimentation".

The original specification and drawings appear to describe an image processing system as depicted in figures 1A and 1C. The system is comprised of hardware "architecture" that "can be configured" by software. The system architecture depicted in these figures is not "configured" as a specific image processing system, for performing any specific image processing task. In fact, the "architecture" of figure 1A is not disclosed as doing anything per se. In order to perform an image processing task (e.g., such as the task performed by the example claim below), the system must be "configured". The "architecture", "software" and numerous possible "configurations" will be individually addressed below.

Regarding the "architecture", the original specification indicates that the invention is an "improved image processing architecture" (original abstract). The summary of the invention at specification page 4 states, "[a] system architecture is provided that provides flexibility, performance, and efficiency." This "architecture" per se is specific,

as outlined in the Modular Configuration Table at specification pages 24-30 and depicted in figures 1A and 1C (the significance of the applicant's "specific" architecture shall be discussed in the section titled *In re Ghiron and Ulrich* 169 USPQ 723 (CCPA 1971) below). While none of the architecture disclosed is "configured" to correspond to the claimed invention as discussed below, it is clear from the specification the applicant's architecture is **not that of a general purpose computer**; because it is the "architecture" that provides the advantages of the invention ("provides flexibility, performance, and efficiency" at specification page 4). **In summary, while specific architecture is disclosed, it is not configured to do anything per se. Functionality of the applicant's disclosed architecture to achieve the claimed results is realized through "configuration". However, this "configuration" would require an undue amount of experimentation given the complete lack of guidance from the specification disclosure.**

Regarding the "software", the specification indicates that the specific "architecture" is under software control and configuration. Specification page 16 (bottom paragraph; emphasis added) states, "[t]he basic configuration with its modular flexibility ... can be configured for various applications with appropriate software in the supervisory processor." Thus, it is apparent from the specification that software is a required factor for the "configuration", and thus operation of the invention. Thus, it would appear that the applicant's disclosed specific architecture requires specific software for configuration. **However, the specification disclosure is absolutely devoid of any software that would configure the architecture to achieve the**

**functionality of the claimed invention. The act of writing such software would require an undue amount of experimentation as will be described below.**

Regarding the "configurations", the specification describes how the system can be "implemented" in various, albeit undisclosed "configurations" with appropriate software. For example, page 16 of the specification states,

> "The image processor can be implemented in a range of configurations, including an image processing subsystem and an image processing system. One configuration is a multiple channel high resolution image processor. Various modules are discussed to accommodate different types of input and output interfaces and multiple channel capability. The various modules of the image processor permit implementation of a basic configuration and then permit modular expansion to a multi-channel system. Modularity permits the basic configuration to be implemented in multitudes of ways using such modules."

Numerous recitations of how the architecture "can be" configured appear throughout the specification (e.g., refer to pages, 133, 148, 156, 185, etc.). To reiterate, the disclosed invention appears to be an architecture that must be "configured" to perform a task. However, none of the disclosed "configurations" provide any guidance for configuring the architecture to perform the acts required by the claimed invention(s).

In summary, the disclosed invention is an image processing system, having specific "architecture" comprised of "modules" that can be "implemented" by "configuring" the modules using "software". What is most telling about the disclosed invention, especially with regard to the 35 USC 112, first paragraph enablement requirement, is what is NOT disclosed. **The specification does NOT disclose how the various "modules" are to be interfaced with one another, to "implement" any**

**one specific "architecture configuration" that would enable one skilled in the art to make and use the claimed invention without undue experimentation.** Rather, the entire specification appears to be an invitation to experiment extensively (The applicant's invitation to experiment extensively will be discussed in detail below).

The "configuration" of the applicant's disclosed invention to achieved the claimed results is an exercise in both hardware and software configuration, and the amount of experimentation involved in such an exercise would be undue.

Example Claim

Each pending claim recites various elements modified by mutual interrelations (e.g., the "in response to" language). Each claimed combination defines a system whereby the claimed elements interact very specifically with one another to produce results that are wholly dependent upon the claimed interrelations and interactions between the elements. While all of the pending claims are rejected on the grounds of lacking an enabling disclosure, an example of a currently pending, non-enabled claim will be cited to clearly explain the examiner's rationale. This same rationale has been applied to all of the pending claims, and all lack an enabling disclosure using the same analysis.

EXAMPLE CLAIM:

**Claim 554 (as presented in amendment J, received on July 25, 2003)** shall be used to exemplify the enablement rejection herein. In this instance, the same example

used above in the written description rejection is relied upon here to demonstrate a lack of enablement. The same example claim is used for the enablement rejection to contrast, and therefore underscore the differences between the rejections. That is, the written description rejection and enablement rejections are based on entirely different rationale, and are not linked by the examiner in any manner. Written description is lacking because the originally filed disclosure does not describe or depict a single, self-contained embodiment that even remotely corresponds to the claimed invention. Enablement on the other hand is lacking because the original disclosure describes a non-configured image processing system having specific hardware architecture under software control, and **offers no guidance at all** as to configuring those modules (either hardware configuration or by software) to make and use the claimed combinations. This shall develop this argument in the explanation to follow.

The Non-Enabled Subject Matter

While the original disclosure describes a non-configured image processing system having specific hardware architecture under software control, the original disclosure **offers no guidance at all** as to making the overall claimed combinations. Particularly with respect to the example claim, the disclosure offers no guidance whatsoever for "configuring" the various "modules" of the disclosed image processing architecture in such a manner as to produce the claimed results, such as the intermediate and final results of the process as depicted in Office Action Figure A above.

That is, in order make and use the claimed invention given the original disclosure, one must "experiment" to "configure" the various disclosed "modules" to "implement" the claimed invention. **It is the examiner's contention that the amount of experimentation required to do so is undue and unreasonable according to the law. That is, the legal criteria for an enabling disclosure have not been met. This contention shall be developed below through factual evidence and applicable law.**

First, it is not even clear from the specification which of the disclosed "modules" corresponds to the individually claimed elements. For example, which of the disclosed "modules" of figure 1A or figure 1C correspond to the individual elements recited in the example claim? That is, which of the elements depicted in Office Action Figure A above correspond to the blocks depicted in the applicant's figures? **However, this point of confusion is not the basis for the enablement rejection**. Even if there were individual modules connected with the system depicted in figure 1A that corresponded to the individual elements of the example claim, or even if some of the existing modules of the applicant's figure 1A corresponded to the individual elements of the example claim, enablement would be lacking for the reasons described below.

The various steps recited by the example claim (e.g., generating GPS navigation information, generating radar information, generating data compressed image information, etc. as depicted in Office Action Figure A above) represent entirely different types of image processing operations, the data generated by and responsible for (i.e., the "in response to" language) those steps have entirely different types of formats, and the corresponding hardware for performing those steps comprise entirely different types

of complex circuits/processors having entirely different input-output characteristics and protocols. Quite simply, the data and the circuits/processors associated with the claimed elements are not directly compatible with one another. In order to interface these disparate circuits/processors and the data they produce, one skilled in the art would require some information as to compatibility or data conversion between their input-output data as well as critical timing, synchronization and control information. It is the examiner's contention that in order to make and use the claimed invention without undue experimentation or delay, at least a rudimentary disclosure of the following information would be required:

- Input-output data format or signal flow between the disclosed modules corresponding to the claimed elements,
- timing or synchronization of data transfer and mutual operations between the disclosed modules corresponding to the claimed elements,
- manner of controlling and making decisions regarding the input-output and timing between the disclosed modules corresponding to the claimed elements.

None of this information is disclosed in the specification. **The specification is completely devoid of any information whatsoever regarding the proper interfacing of the disclosed modules commensurate with the claimed invention.**

Evidence that at least some disclosure of such information is required for an enabling disclosed shall be presented below.

The *In re Wands* Test and Proof of the State of the Art

The test for enablement is whether the claimed invention is enabled so that any person skilled in the art can make and use the invention without undue experimentation. The determination that "undue experimentation" would have been needed to make and use the claimed invention is not a single, simple factual determination. Rather, it is a conclusion reached by weighing all the factual considerations (*In re Wands*; see MPEP 2164.01, Test of Enablement). The eight (8) Wands factual considerations are:

> The breadth of the claims,
> The nature of the invention,
> The state of the prior art,
> The level of one of ordinary skill in the art,
> The level of predictability in the art,
> The amount of direction provided by the inventor,
> The existence of working examples,
> The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The Wands factual considerations have been considered and weighed as follows.

To begin with, the critical factual consideration is the "state of the prior art". The state of the prior art has everything to do with the amount and nature of a description required to enable one skilled in the art to make and use an invention without undue experimentation. In the art of image processing, and approximately 20 years ago (i.e., as of the effective US filing date), at least SOME disclosure of an interface between

disparate image processing circuits/processors was required. As evidence of the state of the art, and as an example of what was required at that time in an analogous art, the examiner points individually to the Sullivan et al. (US 4,179,823 A) reference and the Rogoff et al. (US 4,590,569 A) reference. Sullivan and Rogoff are presented herein as evidence of the content and extent of description required of an enabling disclosure relating to an image processing system at the time of the applicant's constructive reduction to practice. Specifically, Sullivan is evidence of an enabling disclosure of a complete image processing system, not unlike the applicant's claimed inventions, whereby complex sub-assemblies perform disparate image processing tasks in response to one-another. Rogoff is evidence of an enabling disclosure of processing and manipulating an image in response to externally input image and non-image data; also not unlike the applicant's claimed inventions. The two references differ only in that Rogoff processes an image in response to diverse, externally input image and non-image data and Sullivan discloses a self-contained image processing system. The pertinence of each reference as it pertains to the enablement requirement will be described next.

The Sullivan Reference

Sullivan is pertinent not only as demonstrating the state of the art at the time of applicant's filing, but also as exemplifying the amount of direction and guidance required for an enabling disclosure at that time.

The Sullivan disclosure is drawn to the same field of endeavor of image processing, and specifically to many of the same image processing operations disclosed and claimed by the applicant. That is, Sullivan performs image processing tasks such as image storage, translation, rotation, clipping, projection, edge enhancement, display generation, user manipulation, etc. as seen in Sullivan's figure 1 (reproduced below as Office Action Figure B). Thus, Sullivan is an applicable and fair reference to use as "state of the art" evidence for an image processing system.

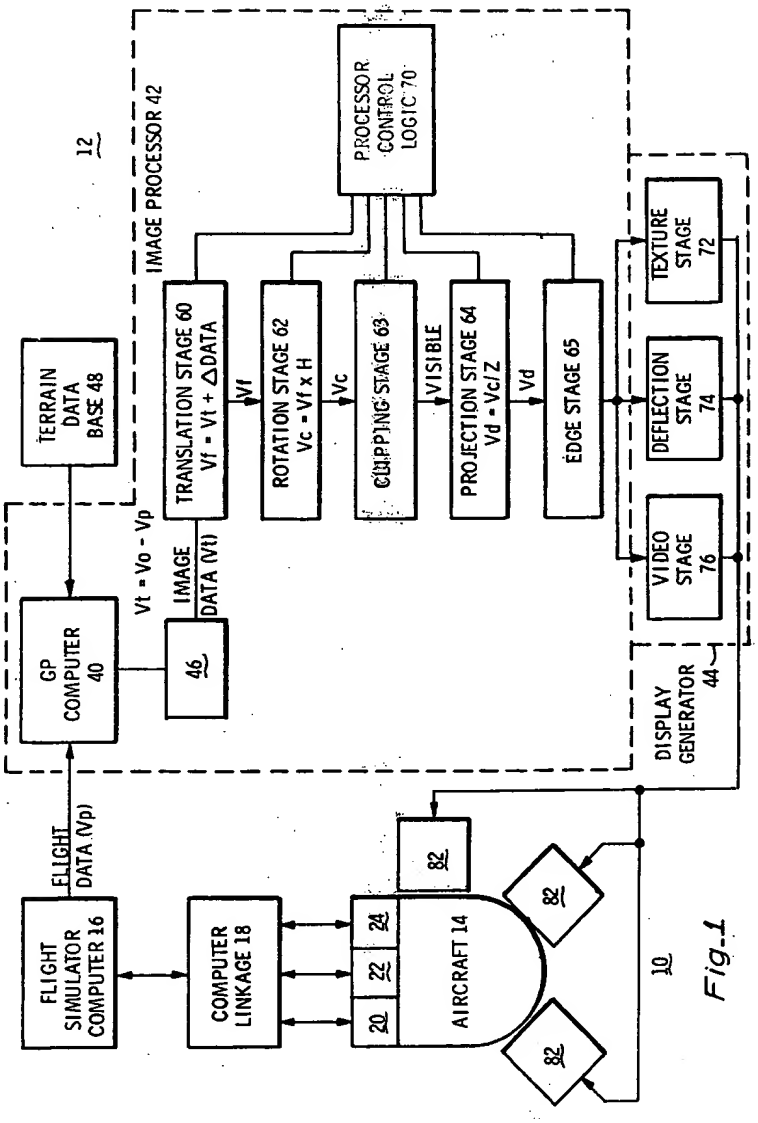



Fig. 1

**Office Action Figure B – Sullivan's figure 1**

Returning to the example claim, while the *combination of elements* is not depicted in the applicant's drawings, some of the elements are individually mentioned in disparate sections of the lengthy specification. However, the enablement rejection is not predicated upon the lack of a written description. Assuming for example that the blocks of applicant's figure 1A (or 1C) could be construed as disclosing the individual elements of the example claim (e.g., as diagramed by the examiner in Office Action Figure A above), the enablement requirement would still not be met. This is because the specification fails to provide any guidance as to how the individual disclosed modules are to be interconnected to produce and achieve the overall claimed results. **That is, there is no disclosure of an input-output signal format between the elements, or of any timing, synchronization, decision making and control required for the elements to properly interact with one another as claimed. Given the state of the art, such details were needed to avoid undue experimentation.**

As evidence, the examiner points to the Sullivan reference. For example, in figure 1, Sullivan discloses a translation stage 60, rotation stage 62, clipping stage 63, projection stage 64 and edge stage 65; all connected in series with one another and all responsive to (i.e., connected in parallel with) the "processor control logic 70". This is analogous to the various elements claimed by the applicant as being connected and interrelated with one another. Regarding these interconnected stages, Sullivan states (column 9, lines 58-61),

> "Each component is described by function, input-output characters, or conventional nomenclature to enable one skilled in the arts of simulation, digital design, and computer programming to practice the invention".

Commensurate with the state of the art at that time, Sullivan recognized that to provide an enabling disclosure (i.e., Sullivan explicitly states, "to enable one skilled in the art ... to practice the invention"), not only did the functions of the various stages need to be described, but that the "input-output" characteristics were required. In order to fulfill the enablement requirement, the Sullivan reference discloses each of these individual stages in figures 3-7 respectively. Sullivan goes on to disclose the timing and "control" of the individual stages at figures 8A-8E.

Figures 3-7 of Sullivan not only provides details regarding the individual functions of the stages depicted in Figure 1, but also the **specific signals necessary for interacting properly with subsequent/previous stages**. For example, looking at figure 3 of Sullivan, the translation stage provides as output an "H and N Matrix" and a "Vf" signal. The nature and details of these signals are fully described in the corresponding written disclosure. Then, looking at figure 4 of Sullivan, the rotation stage inputs the "H and N Matrix" and "Vf" signals directly from the translation stage, and continues with rotation processing **based directly upon the format of these signals**. Sullivan sates (column 12, line 38):

> "FIG. 4 shows rotation stage 62 of image processor 42 which multiplies the translated point vectors Vfl-Vfn from translation stage 60 by the rotation matrix H provided on bus 307 to produce a rotated or channel vectors Vc ..."

Sullivan not only designates the specific signals to be output from the translations stage for input into the rotation stage, but Sullivan describes the bus that transfers the data (i.e., "bus 307") and the operations performed by the rotation stage on the specific signals taken from the translation stage (i.e., "multiplies").

**Sullivan is evidence that given the state of the art, a certain level of detail was required to enable one skilled in the art to interconnect complex image processing sub-assemblies without undue experimentation. The applicant's original disclosure fails to provide any detail whatsoever regarding the interconnections and interrelations between the claimed elements.** The details of the signal format required between the elements in the applicant's disclosed invention is completely lacking. **In the case of applicant's disclosure, there is no nexus at all (either in the figures, or in the specification) between the individually described functional elements.**

Again, commensurate with the requirements of the example claim, there are no details in the applicant's disclosure at all regarding the signal format, or signal exchange between the individual elements depicted in Office Action Figure A above (such as the "H and N Matrix" and a "Vf" signals provided by Sullivan). Sullivan is evidence that at least some such details were required given the state of the art at the time of applicant's filing.

Further, Sullivan does not stop at signal format. Sullivan provides details of the timing/synchronization, decision-making and control required between the various stages so that they can properly interact with one another. For example, Sullivan's

figure 8A outlines the control of the rotation stage, as fed by the translation stage. Figure 8A shows how the rotation stage is controlled with respect to the "H and N Matrix" and "Vf" signals provided by the translation stage. That is, in figure 8A, step 1, Decision A, Step II, and the "is FACE VIS" blocks collectively determine whether or not, and when to "load" a "new Vt" signal from the translation stage into the rotational stage. This timing and coordination between the stages was necessary for an enabling disclosure. **The applicant's disclosure is completely devoid of any description of signal formatting for data transfer between the elements, and completely devoid of any timing/synchronization, decision-making and control between the individual elements.**

Finally, Sullivan provides extensive software instructions commensurate with the timing and control diagrams as described at columns 19-28. This programming is directly related to both the functions of the individual stages, and to their interactions (i.e., signal format, timing and control) between them. While applicant's specification recites what appear to be BASIC language computer programs, none have anything to do with the interaction between functional elements as diagramed in Office Action Figure A above.

Thus, the Sullivan reference provides guidance from the detailed description, drawings and software including:

descriptions of individual functions of the image processing elements (e.g., figures 3 and 4 correspond to the translation and rotation stages);

signal format for data transfer between elements (e.g., the "H and N Matrix" and a "Vf" described above);

timing, decision-making and control of data transfer between the elements (e.g., figure 8A); and

software corresponding to the signal format, timing, decision-making and control (columns 19-28).

**Absolutely no such information is provided by the applicant's disclosure.**

The Rogoff Reference

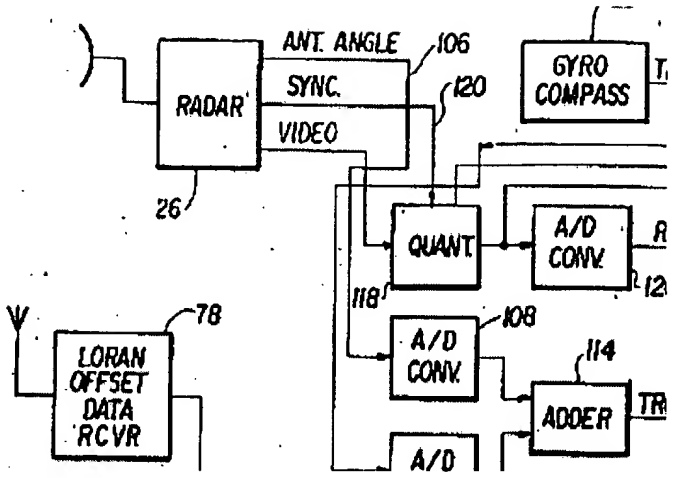
The Rogoff reference, like Sullivan, is also provided as evidence of the guidance necessary to interconnect disparate image processing elements to perform diverse image processing functions. However unlike Sullivan, Rogoff processes images in response to diverse external data such as Loran navigation and Radar information (i.e., see Rogoff figure 6). Thus, Rogoff is provided as evidence of the amount of guidance necessary to achieve diverse image processing operations in response to such diverse externally input information (e.g., Loran and Radar information).

Recall that the example claim (as diagramed in Office Action Figure A above) requires the generation of data (or information) in response to diverse types of other information. It is not clear from the applicant's claimed invention, or from the originally filed disclosure, whether any of the claimed data (or information) is in the form of image data, or non-image data. For example, is the "GPS" or "radar information" in the form of an image, or non-image data related to GPS and radar? In addition, it is not clear

whether this information in input from an external source (i.e., a source not depicted in the figures) or whether it sourced from a component of the disclosed invention (i.e., one of the modules depicted in figure 1A or 1C). Thus, given this uncertainty, evidence will presented below regarding the extent of enabling content required to process an image in response to either image data or non-image data, either being externally input or otherwise.

Rogoff discloses an image processing system that manipulates an image (i.e., as depicted in figure 4) in response to very diverse types of input data, including image data (e.g., radar as depicted in figure 3) and non-image data (e.g., loran navigation information as depicted in figure 3). The entire Rogoff system is depicted in more detail in figure 6. In summary, figure 6 of Rogoff depicts a display at numeral 94, where stored map images (e.g., figure 4) are manipulated in response to the input image and non-image data, along with the display control electronics and the various input circuitry associated with the aforementioned diverse input data.

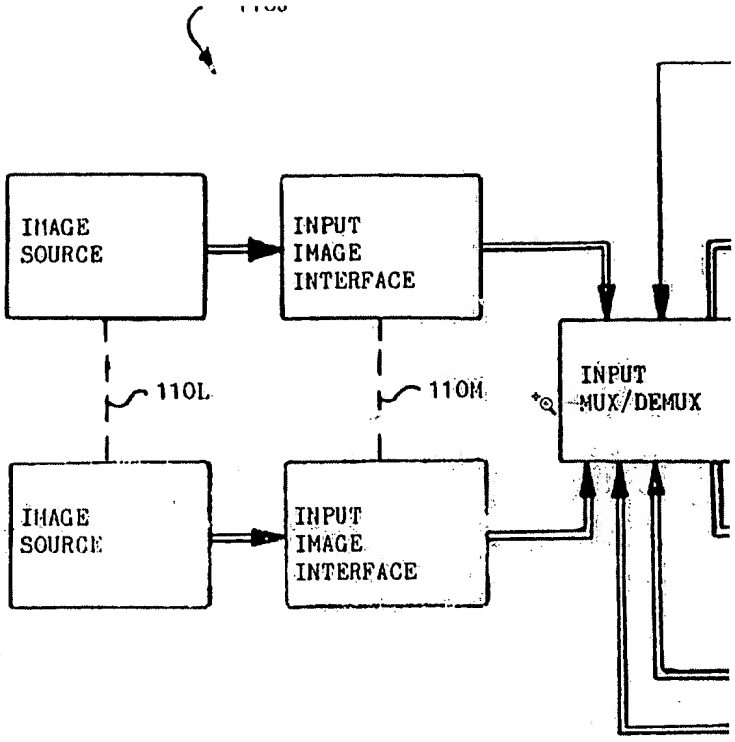
Rogoff processes image data (i.e., the map data) in response to externally input image data (i.e., radar image data at figure 6, numeral 26). Rogoff depicts in the figures and discloses in the specification the signal format, synchronization and interfacing circuitry between the Radar device and the image processing system. That is, the radar device (numeral 26) outputs specific signals pertaining to antenna angle, synchronization and video (the three output lines at numeral 26) as described in the Rogoff specification and depicted in figure 6 as follows:




**Office Action Figure C – Excerpt of Rogoff's Figure 6 showing "radar"**

It is noteworthy the Rogoff does NOT leave these "interfacing" details up for experimentation. Rather, Rogoff specifically discloses them. It is the examiner's contention that such details (or at least a rudimentary disclosure thereof) were required to avoid "undue" experimentation. **The Rogoff disclosure is in stark contrast to the applicant's disclosed invention, where no such details (e.g., synchronization, signal format, etc.) are provided AT ALL.**

For example, the applicant's figure 1A depicts input image sources at numerals 110L, as follows:




**Office Action Figure C1 – Excerpt of Applicant's Figure 1A showing "image source"**

However, there is no description either in the drawing or in the specification as to the nature of the interface between the image sources and the actual image processing circuitry. While modules 110M of applicant's figure 1A are labeled as input image interfaces, the nature of the signals input thereto, or output therefrom are not described. The specification is completely silent as to the nature of the signals, let alone any timing, synchronization or control.

Rogoff does not stop at simply disclosing the nature of the interface. The Rogoff signals are then processed as depicted in figure 6, to ultimately "integrate the radar display and chart into a composite display" (Rogoff, column 13, line 38). Rogoff provides a description of how the three (3) radar output signals are processed to achieve the "composite display". That is, the signals are quantized, A/D converted and added at figure 6, numerals 108, 112 114, 118 and 120. Then, Rogoff states:

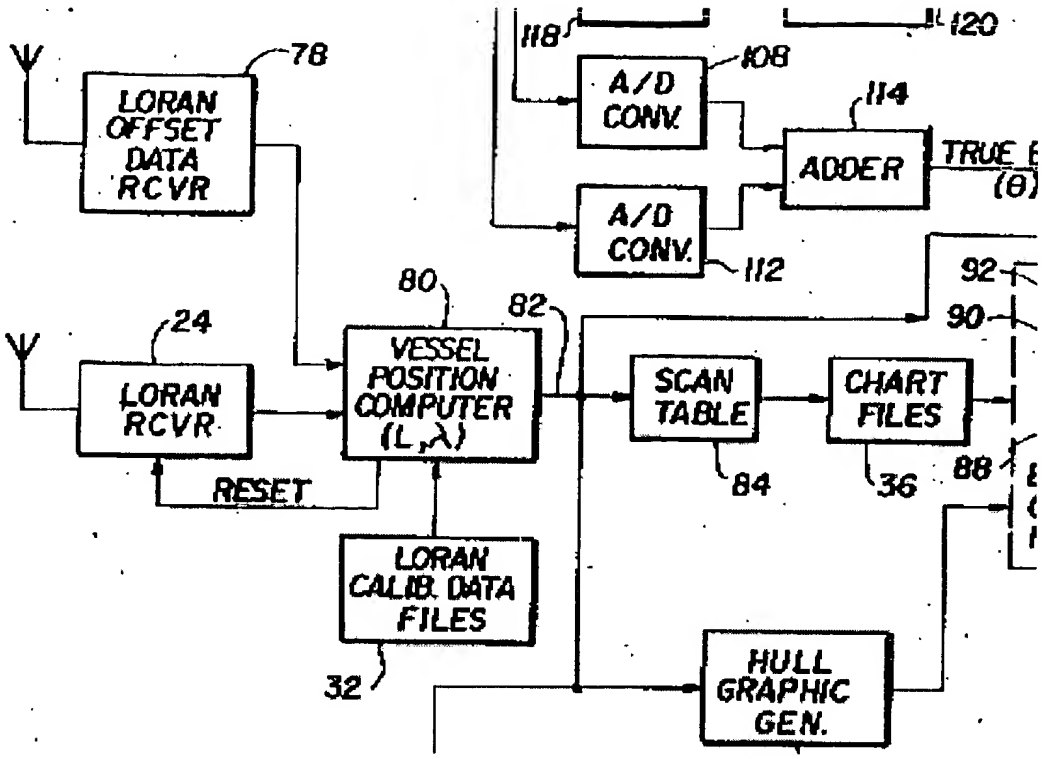
> "The outputs R and θ from A/D converter 120 and the adder 114 are next fed into a polar to rectangular coordinate converter 122, which comprises a digital multiplier. The converter 122 is operable to calculate $X = R \sin \theta$ and $Y = R \cos \theta$ which now comprise digital signals expressed in rectangular X and Y coordinates ..."

Thus, Rogoff not only provides the specific types of signals required to interface the external image device with the image processor, but also the specific manner in which those signals are processed to manipulate a displayed image. Rogoff does not leave these details up for extensive experimentation. It is the examiners contention that such experimentation would have been undue, and unreasonable. **Again, the applicant's disclosure is completely devoid of ANY such details.**

Rogoff is evidence that, at the time of the applicant's constructive reduction to practice, at least SOME disclosure was required of how stored image data (i.e., Figure 6, numeral 86 of Rogoff) is processed and displayed in response to externally input image data (i.e., the radar device of Rogoff). Again, Rogoff describes the nature of the signals received from the external image device (i.e., the aforementioned video, synchronization and antenna angle information), and also how those signals are

synchronized and processed to ultimately control the displayed, composite image. **The applicant's disclosure on the other hand is completely devoid any such description whatsoever.** That is, referring to the example claim as diagramed in Office Action Figure A above, the applicant's disclosure provides no description whatsoever pertaining to the nature of the signals between the individual elements, let alone the manner of synchronizing the interface between elements to achieve the claimed interrelations. It is the examiner's contention that without a least a rudimentary disclosure of how externally input image data is interfaced, synchronized and processed to control/manipulate images (i.e., as described by Rogoff), one skilled in the art would require undue experimentation to make and use the claimed invention.

Regarding the processing of image data in response to externally input non-image data, Rogoff receives Loran navigation information at figure 6, numerals 24 and 78. Rogoff not only provides a thorough mathematical description of the Loran system at columns 5-8, but Rogoff describes how the Loran data interfaces with the image processing portion of his invention. For example, the Loran signals are depicted in figure 6 as follows:




**Office Action Figure C2 – Excerpt of Rogoff's Figure 6 showing "Loran"**

In the corresponding section of the specification, Rogoff states (column 11, lines 34-41):

> "The conversion of Loran time differences to longitude and latitude (L and λ) is effected in the computer 80 by an iterative converging process which comprises obtaining the proper value of interpolated virtual based line delays Dx and Dy from three calibration points which are nearest to the vessel and whose coordinates L and λ and virtual based line delays Dx and Dy are stored in the calibrating data files 32 ..."

Then, Rogoff proceeds to explain how the Loran data is processed to control the displayed image at figure 6, numerals 84, 36, 124, etc. Rogoff is presented here as

evidence of an enabling disclosure that processes and manipulates image data in response to externally input non-image data (i.e., data having entirely different formats). Rogoff not only describes the nature of the signals from the non-image input source (i.e., the Loran), but also how the signals are processed and converted to ultimately control a displayed image. While the applicant's claimed invention also requires image processing in response to (presumably) non-image input information (e.g., the "GPS" and "radar" information of the example claim), **the original disclosure is completely devoid of any description whatsoever pertaining to how the non-image input data is converted, or processed to effect image processing.** Again, using Rogoff as evidence, at least some such description would be required to make and use the applicant's claimed invention without undue experimentation. **The applicant's disclosure is completely devoid of any such information.**

Sullivan and Rogoff are presented herein as evidence of the guidance necessary for an enabling disclosure of interconnected and interrelated elements of an image processing system; particularly in light of the skill level and state of the art at the time of the applicant's constructive reduction to practice. The examiner is not contending that ALL of what Sullivan and Rogoff disclose is necessary in every instance. However, at least SOME guidance is necessary to avoid undue experimentation. NO guidance whatsoever is provided by the applicant's disclosure in the form of signal format, timing/synchronization, decision-making, control or software; particularly with respect to the claimed invention.

For example, given the example claim above, and turning to the applicant's specification for guidance, on skilled in the art would first look for the corresponding disclosed embodiment. Such an embodiment does not exist (i.e., there are no embodiments that correspond to the claimed invention). Then, one would need to determine which of the disclosed modules correspond to the claimed elements. As mentioned above, this is not clear. However, assuming that the disclosure does describe "modules" that corresponded to the claimed elements as diagramed in Office Action Figure A above, one would look for at least rudimentary guidance as to how to interconnect and interface those modules (i.e., such as the signal format, timing/synchronization, decision-making and control disclosed by Sullivan and Rogoff) in such a way as to produce the claimed results. However, as described above, there is absolutely NO guidance whatsoever in this regard. Therefore, the person skilled in the art would be left to experiment with the "modules" of the disclosed "architecture", in order to "implement" the claimed invention by "configuring" the architecture hardware, presumably by writing the appropriate "software". In other words, one skilled in the art would be starting with little-to-nothing. **Effectively, the only guidance provided to one skilled in the art would be the claimed invention itself, and nothing more.** The examiner has presented evidence in the form of the Sullivan and Rogoff references that, in light of the Wands criteria, some guidance at the time the invention as made and related to interfacing disparate image processing elements was required. However, little-to-no guidance in this regard is provide by the applicant's disclosure, and this leads

the examiner to the conclusion that undue experimentation would be required to make and use the claimed invention.

In summary, Sullivan is evidence of the extent of guidance necessary, at the time of applicant's constructive reduction to practice, for the complex interactions between disparate image processing operations. Rogoff is provided as evidence of the extent of guidance necessary for the complex interactions of an image processing system that is responsive to externally input image and non-image data. **The level of detail, direction and guidance set forth by Sullivan and Rogoff, including descriptions of signal format, timing/synchronization, decision-making and control between functional image processing elements, is indicative of the state and level of skill in the art at the time of applicant's filing.** It is clear from Sullivan and Rogoff that when complex image processing stages are connected with one another to interact with one another, such as those claimed by the applicant, there must be at least some description of how those elements interact with one another such as the signal format, timing and control as described by Sullivan. **Applicant's disclosure provides no information at all as to the format of the signals passing between the functional elements, their timing or control.**

Regarding the remainder of the Wands factors not heretofore discussed, the "nature" of applicant's invention is highly complex, and analogous to that of Sullivan and Rogoff (i.e., complex image processing sub-assemblies). Such complexity requires at least some disclosure of how image processing sub-assemblies interact with one

another as provided by Sullivan and Rogoff. Regarding the existence of working examples, none are disclosed by the applicant that correspond to the claimed invention.

Software Burden

As described above in the *In re Wands* section, the specification describes what appear to be BASIC language computer programs (e.g., refer to page 547 of the specification). However, upon examination of these programs, none appear to integrate and interface the disclosed hardware architecture into to a self-contained, functioning system as claimed. Further, none of the programs even perform the individually claimed functions of the individual claim elements. Thus, the software disclosed by the applicant does not remedy the disclosed deficiencies described above, and offers no guidance whatsoever for interconnecting the complex image processing elements as claimed. Given that (according to the applicant's own specification) the applicant's disclosed "architecture" is specific to the invention and under software control and configuration, and given the complete lack of disclosed software pertaining to the claimed elements and their interrelations, one of ordinary skill would be starting with nothing at all. That is, the claims, whether method or apparatus, are drawn to the disclosed invention which is a nexus of hardware architecture under software control and configuration. In order to make and use the claimed invention, one of ordinary skill would have to develop the software to coordinate and control the hardware (i.e., the applicant's specific architecture) to perform the aforementioned complex interactions between individual image processing elements. Given the existing disclosure, one of

ordinary skill would have zero guidance from the specification either in the form of software, or in the form of any information regarding the input-output format between the claim elements, their timing or control as already described. Hardware aside, programming the software alone would require an extreme amount of experimentation given the lack of guidance from the specification.

As evidence of this software burden, the examiner points to the article by Hudson (A practical solution using a new approach to robot vision – SPIE). The Hudson system is similar to applicant's own, in that it comprises image processing hardware under software control/configuration to perform image processing functions. At page 224, section 3 of the article titled "develop the application software", Hudson describes the immense task of developing the software for such a system, including:

- The development of test programs;
- The assembling of test hardware;
- Entering and editing the application program;
- Testing the program; and
- Refining the programs and hardware until reliable performance is achieved.

Each of the above software development steps is a complex, error prone and time-consuming task requiring a large amount of experimentation. That is, three of the five software development steps described by Hudson are dedicated to the error prone

nature of the task: "editing", "testing", and "refining" the software until a "reliable performance" is achieved. This is because programming such a complex image processing system is very complex and error prone, as one of ordinary skill must test, edit, and refine the software numerous times until reliable performance is achieved. In order to develop software for integrating applicant's specific architecture to make and use the claimed invention, without any software or hardware guidance at all from the specification, it is the examiner's contention that the burden would be tremendous. Even if the applicant's disclosure described the input-output characteristics, timing and control between the hardware elements (which, as described above, is completely absent from the specification), the applicant's disclosed system comprises specific architecture under software control. Thus, in the absence of any guidance whatsoever in the form of the disclosed software, or even rudimentary flow charts, developing the necessary software to integrate the disclosed "architecture" to perform the claimed functions could take years of experimentation.

For example, in the article by Egeli et al. titled "A hardware and software optimized program system for interactive image processing" (SPIE), a combined hardware and software image processing system is disclosed. Egeli describes how the software package development took at least "ten years" (page 134, bottom paragraph). Likewise, the hardware and software image processing system disclosed by Endsley et al. (titled "A practical architecture for a real-time image resampling processor" – SPIE) took "years" to develop (page 185, bottom paragraph). This contention is echoed by the court in the *In re Ghiron and Ulrich* decision described below, where the court stated

that, "It is common knowledge that many months or years elapse from the announcement of a new computer by a manufacture before the first prototype is available." The development of software to integrate an image processing hardware/software system takes a tremendous amount of experimentation because of the testing, editing and refining required, and therefore years of development. Given the complete lack of guidance in applicant's disclosure, the same applies.

The time, complexity, and error prone nature of software development for the integration of hardware architecture elements is yet another factor that the examiner has considered. Is not the only factor considered in the rejection. **The rejections is based on the culmination of evidence presented herein, and the examiner contends that the culmination of evidence supports the conclusion that enablement is lacking.**

*In re Ghiron and Ulrich* 169 USPQ 723 (CCPA 1971)

The applicant's disclosed system requires a specific "architecture" under software control and configuration as described above. This is similar to the situation faced by the *In re Ghiron* court.

First, the Ghiron claims at issue were drawn to a method, wherein various claim elements along with their interrelations with other elements were recited. For example, refer to Ghiron claim 6, at decision page 725. The Ghiron claims are similar to applicant's own method claims, such as the example claim cited by the examiner above.

Second, the Ghiron disclosure comprised "block diagrams" in the form of rectangles representing the elements of the system, functionally labeled and interconnected by lines (decision page 728). This is similar to the applicant's figures, such as figures 1A and 1C.

Third, in Ghiron, "the method cannot be performed by a general purpose computer of the prior art" as described at decision page 728. This is similar to applicant's disclosure, which requires specific image processing "architecture".

Fourth, in Ghiron, the system was software controlled (e.g., "instructions" and "stored program" at decision page 724). This is also similar to applicant's system, which is described by the specification as being configured and coordinated by software as described above.

In the Ghiron decision, and regarding the claim rejections upheld by the Board of Appeals under 35 USC 112, first paragraph, enablement, the court agreed with the Board in that:

> "... definite apparatus is required to practice the claimed method; that an adequate disclosure of how to practice the method requires a disclosure, or reference to a disclosure, of suitable apparatus; and that the present application lacks such a disclosure" (page 728).

In the Ghiron decision, the Board noted and the court agreed that (emphasis added):

> "... the specification does not particularly identify each of the elements represented by the blocks or the relationships therebetween, nor does it specify particular apparatus to carry out each function" (decision page 728).

The court further agreed with the Board of Appeals that (emphasis added):

> "... many of the components which appellants illustrate as rectangles in their drawings necessarily are themselves complex assemblages that can have widely differing characteristics that must be precisely coordinated with other complex assemblages. It is common knowledge that many months or years elapse from the announcement of a new computer by a manufacture before the first prototype is available. This does not bespeak of a routine operation but of extensive experimentation and development work that would be inconsistent with appellant's bare allegation that the instant disclosure would put a person of ordinary skill in the art in possession of the apparatus to carry out the claimed method. The lines interconnecting the rectangles of appellant's drawings do not represent electrical conductors but merely indicate the routing of intangible data or information between functional modules".

In the case of applicant's claimed invention, such as the example claim above, a disclosure of a definite apparatus suitable for practicing the invention is lacking. Moreover, and similar to *In re Ghiron*, the applicant's claimed invention requires the proper coordination (e.g., the aforementioned input-output characteristics, timing, synchronization and control) of complex assemblages having widely differing characteristics (e.g., as described above, and diagramed in Office Action Figure A above). It is the examiner's contention that for reasons equivalent to those cited by the *Ghiron* court, the applicant's own disclosure does not provide the necessary guidance to put a person of ordinary skill in the art in possession of the apparatus to carry out the claimed method. Further, in light of the deficiencies in applicant's disclosure, and similar to Ghiron, the experimentation required to make and use the claimed invention

does not bespeak of a routine operation but of extensive experimentation and development, both in software and in hardware.

*In re Scarbrough 182 USPQ 298 (CCPA 1974)*

In the *In re Scarbrough* decision, the court agreed with the Board of Appeals in affirming a 35 USC 112, first paragraph enablement rejection. The situation was similar to applicant's disclosed and claimed invention, where the Scarbrough specification described an apparatus, and the claims at issue were both method and system claims. The appellants enumerated several devices by generic name and function, including a "digital computer", "timing and control", "A/D converter", "delay counter", and "output control" and argued that "a person of ordinary skill would be enabled to make and use the apparatus with only a reasonable amount of experimentation" (decision page 302).

The *Scarbrough* court agreed with the Board of Appeals that (emphasis added), "even if each of the enumerated devices were old, per se, this would not make it self-evident how each would be interconnected to function in the complex manner described in the application" and "timing between the various units is of the essence and without a timing chart relating the timed sequences for each unit an unreasonable amount of work would be required to come up with the detailed relationships appellant says that he has solved" (decision pages 302-303).

Regarding the applicant's disclosure, various devices are individually described by generic name and function. For example, referring to figure 1A, a "geometric module", "spatial module", "supervisory processor", etc. are generally depicted. These

devices are individually described in disparate sections of the specification with respect to their overall function. However, there is no description in the specification as to how these devices interact with one another, and there is no description in the specification of these devices being interconnected in a manner commensurate with the claimed invention, to produce the claimed results. Certainly, there is no disclosure of input-output signals, format, control or timing between the individual elements. Thus, for reasons equivalent to those cited by the Scarbrough court, it the examiner's contention (and based on the evidence already presented above) that even if each of the applicant's disclosed devices were old, this would not make it self-evident how each would be interconnected to function in the complex manner as claimed. Timing, control and input-output characteristics between the various units is of the essence and without a such details for each unit an unreasonable amount of work would be required to come up with the detailed relationships the applicant has claimed.

*In re Gunn 190 USPQ 402 (CCPA 1976)*

In the *In re Gunn* decision, the court agreed with the Board of Appeals in affirming a 35 USC 112, first paragraph enablement rejection. The claimed invention was directed to complex, interconnected and interrelated functional elements as described at decision page 404. The claims at issue were both method and apparatus.

In the examiner's answer, the examiner noted that the "specification fails to describe this apparatus, disclosing only the function of the hollow rectangles" and

concluded that "what has been disclosed in only an idea, which appellant leaves to the skill of the art to reduce to practice" (decision page 405).

The Board of Appeals agreed with the examiner, observing that "the disclosure fails to show how the various structures should be 'interconnected, timed and controlled so as to obtain the specific operations desired by appellant'", and concluded that "appellant's disclosure is 'little more than an invitation to those skilled in the art to experiment extensively,' and that the examiner had a reasonable basis for questioning the adequacy of appellant's disclosure" (decision pages 404-405).

In like manner, the applicant's figures depict a collection of individual, functional image processing elements (e.g., the supervisory processor, geometric module, spatial module, etc. of applicant's figure 1A) that are only described in disparate sections of the specification by their generalized, individual functions. The specification never once describes the integration of the individual disclosed elements to perform the overall claimed functions. That is, the specification never once describes any interconnections or interrelations between the individual functional elements, including any timing between them, any control between them, or any input-output characteristics between them in such a manner that would enable one skilled in the art to make and use the later claimed inventions without undue or unreasonable experimentation.

Thus, for reasons equivalent to those cited by the examiner as described in the *In re Gunn* decision, it is this examiner's contention that the applicant's specification fails to describe the claimed system(s), disclosing only the functions of rectangles

depicted in the figures which the applicant leaves to the skill of the art to reduce to practice.

Further, for reasons equivalent to those cited by the Board of Appeals as described in the *In re Gunn* decision, it is the this examiner's contention that the applicant's disclosure fails to show how the various structures should be interconnected, timed and controlled so as to obtain the specific operations now claimed by the applicant, and the applicant's disclosure is little more than an invitation to those skilled in the art to experiment extensively.

*In re Wright, 27 USPQ2d 1510*

The In re Wright decision is also relevant to the enablement rejections herein. While the subject matter at issue in Wright is not directly equivalent to that disclosed and claimed by the applicant, the situation that faced the Court is.

The Wright claims and disclosure were directed to the production of live, non-pathogenic vaccines against pathogenic RNA viruses. The Wright specification provided a "general description of these processes, vaccines, and methods of use, but only a single working example" (page 1512). The Examiner took the position that certain claims on appeal were

> "... not supported by an enabling disclosure because one of ordinary skill in the art would have had to engage in undue experimentation in February of 1983 (the effective filing date of Wright's application) to practice the subject matter of these claims, given their breadth, the unpredictability in the art, and the limited guidance Wright provides in his application" (decision page 1512).

The examiner further argued that Wrights specification only described a "very general manner" of practicing the invention (page 1513).

The Board agreed with the examiner, finding that

> "Wright had failed to establish that the general description of his invention set forth in his application was anything more, in February of 1983, that an invitation to experiment" (page 1513).

The Board also agreed with the examiner that the "general description does not set forth such sufficient detailed guidance that one of ordinary skill in the art would have had any reasonable expectation of success in constructing other vaccines against other RNA viruses." (page 1513). Ultimately, the Court agreed by affirming the Board.

While the nature of the subject matter disclosed and claimed by Wright is different from that of the applicant, the similarities between the two are as follows. Similar to Wright, the applicant's specification must have provided enabling support as of the effective filing date; in the applicant's case, in the year of 1984. Also similar to Wright, the applicant's description is "general". That is, the applicant discloses a generalized image processing system as described in the rejection above. However, in the applicant's case, there are NO working examples of ANY of the claimed subject matter. Furthermore, the applicant's disclosure is nothing more that an "invitation to experiment" (discussed in the next section below).

The examiner has come to essentially the same conclusion regarding the applicant's disclosure. That is, one of ordinary skill in the art would have had to engage

in undue experimentation in 1984 to practice the subject matter of the currently pending claims, given their breadth, the unpredictability in the art, and the limited guidance that the applicant provides in his application, and the applicant has failed (to this point) to establish that the general description of his invention set forth in his application was anything more, in 1984, that an invitation to experiment. **The Wright decision is presented herein as evidence that the rejection advanced herein is reasonable and appropriate given the circumstances facing the examiner, and to reinforce that fact that the applicant's specification must have been enabling as of the effective filing date.**

Invitation to Experiment Extensively: Applicant's Experimental System

Extensive experimentation, in the absence of a working system, appears to be the theme of the applicant's specification. The language used throughout the specification appears to be an invitation to one skilled in the art to experiment extensively, rather than to make and use any particular image processing system; such as those now claimed (i.e., approximately twenty (20) years after the original filing date). For example, the specification is replete with the use of terms like "can be", "may be used", "could be used", "such as", "for example", etc. (see the above quoted sections of the specification from pages 454, 466, and 494, for example) without any accompanying specifics as to how these various possibilities and permutations of possibilities can be implemented (either individually or as part of a larger, complete system). **The specification is simply an amalgamation of permutations of possibilities of things**

**that might be able to be performed without any details.** Nowhere in the lengthy specification does Applicant actually provide a description that would correspond to the claimed subject matter. Particularly with regard to enablement, the specification does not describe any interconnections and interrelations between the disclosed image processing elements, including input-output characteristics, timing, synchronization and control that would enable one skilled in the art to make and use the invention without undue or unreasonable experimentation. Finally, the applicant even discloses an "experimental system" at specification page 31. The specification then goes on to describe numerous "configurations" of the experimental system (e.g., refer to pages, 133, 148, 156, 185, etc.), none of which correspond to the claimed subject matter, and none of which discloses any input-output characteristics, timing, control or programming required to make and use the invention without undue experimentation. Further, by the specification's own admission, the "architecture" is "configured" and under "software" control as described above. However, there is no disclosure of software that configures or otherwise controls the "experimental system". Thus, the experimental system is "configured", and thus cannot serve to provide any guidance whatsoever for making and using the claimed invention.

Non-Enabled as of Most Recent Filing

While the above enablement rejection has been appropriately advanced with respect to the applicant's "effective filing data", it is noted that the specification lacked enablement as of the most recent filing of a continuation in June of 1995. Even in 1995, at least some disclosure would be required of the input-output characteristics, timing,

control and programming required to make interface disparate and complex image processing assemblages in order to make and use the invention without undue experimentation. The art of image processing has not matured to a point where such details are not at all required to interface complex assemblages. The examiner shall explain how the software burden and the requirements for an enabling disclosure were not met even as of the most recent filing.

The software burden: The articles relied upon above, while being published in 1983, are still pertinent as demonstrating the software burden because the process of developing software has not changed. If anything, software has gotten far more complex, and requires far more lines of code to develop, test, evaluate and troubleshoot and thus the software burden at the time of the most recent filing would have been even greater than in 1984.

Regarding the requirements of an enabling disclosure in general: Billing et al. (US 5,220,428 A) discloses an image processing system that is very similar to the applicant's disclosed and claimed invention. Further, Billing was published in 1993, a few years before the filing date of the continuation in 1995, and is thus a contemporary (for purposes of the "state of the art") of the applicant's disclosure at that time. While the state of the art had changed somewhat between the publication of Sullivan and Rogoff and the publication of Billing, the art had NOT matured to the point where little-to-no disclosure would have been required to meet the "enablement" requirement. The examiner shall demonstrate using Billing as evidence that an enabling disclosure in the art of image processing still required certain details regarding element/circuit

connectivity and signal exchange between them; even in the mid 1990s. Again, the art had NOT (and still hasn't) matured to the point where little-to-no disclosure at all can provide enablement for interconnected, interrelated and disparate elements of an image processing system.

Billing discloses a system for "processing stored video images to reproduce image information from one image frame of a video signal so that it appears within another image frame of a video signal as if transposed onto a curved surface" (column 1, line 18). Furthermore, in order to perform this type of image processing, the Billing system relies upon elements and circuits that are similar, and in some cases the same as those disclosed and claimed by the applicant. For example, Billing discloses an input circuit ("reading the picture information" at column 5, line 40), a first memory (figure 3, numeral 13), a 2D address generator (figure 2), a first memory writing circuit (figure 3, numeral 22), a first memory access circuit (figure 3, numeral 24), a 2D weight circuit (figure 2, numeral 5; "W1 – W9"), and a processor (figure 1, numeral 102). Therefore, given the contemporary publication date and the nature of the disclosure, Billing is a fair representation of an enabling disclosure of subject matter claimed by the applicant as of the June, 1995 filing.

Unlike the applicant's disclosure, Billing discloses a complete image processing system where each and every circuit is interconnected with the other circuits required to fulfill the ultimate image processing operation, and where the nature of the signal exchange between the circuits is clearly described. **The examiner is NOT contending that enablement is lacking because of the applicant's failure to disclose a**

**complete, self-contained embodiment of the claimed system. Rather, enablement IS lacking because of the applicant's failure to disclose HOW the individual claimed circuit interrelate with one another, by virtue of what signals are passed between them, and what processing is performed by the circuits in response to those signals.** Without such details, it is the examiner's contention that and unreasonable amount of experimentation would have been required to make and use the claimed invention given the deficiencies of the applicant's disclosure.

For example, figures 1, 2, 3 and 5 of Billing depict the complete functioning system. The image processing begins with figure 1 where a function defining the curved image surface is stored the RAM memories, and from which preliminary image addresses are generated. Signal flow proceeds to figures 2 and 3 where the final image address data is output at line 25. Figure 5 depicts details of the intermediate processing of figure 3.

More specifically, Billing describes the nature of the signals output from each circuit, how those signals were generated, and how those signals are processed in subsequent blocks. Billings is evidence that at least some disclosure of the nature of individual circuits and the signal exchange between them is required for an enabling disclosure. For example, at figure 3, numerals 23, Billing generates horizontal and vertical integer and fractional pixel addresses for the subsequent addressing of memory 13. Memory 13 has a data input, a data output, a read address, and a write address as depicted therein. The integer portion of the address are generated by the "integer truncaters" 23, and are then output to lines 11 and 12 (i.e., the "write address") of

memory 13. The fractional portions are then processed in figure 5, and used in multiplier 22 in figure 3 to affect the "data in" at the same time that the integer portions provide a "write address". This is an example of "synchronization" disclosed by Billing. Billing not only describes the nature of the signals that are input to the integer truncaters 23, but he also describes where they come from, how they are created, and ultimately how they are used to address memory 13 to affect the disclosed image processing. Billing also describes specifically how the fractional portions are processed in figure 5 for subsequent use in multiplier 22. For example, Billing discloses that inputs to numerals 23 (i.e., the truncaters that create the integer and fractional addresses) are derived in figure 2, which outputs X", Y" and Z" addresses. The process of how those X", Y" and Z" addressed are generated, using weights, multiplication and additions, is specifically described in the disclosure with respect to figure 2. Figure 2, in turn, accepts x, y and z data from figure 1 as depicted. Figure 1 not only describes how the x, y and z addresses are generated using functions stored in the RAM, addition, multiplication and an arithmetic unit, but also generates H and V addresses at numerals 3, which are in turn input directly to figure 3, numerals 14 and 15, etc. The point here is that Billing describes the nature of the signals exchanged between individual circuits/processors, how those signals were derived, how those signals are subsequently processed, what steps must be synchronized, as well as the important connectivity between the circuits required to enable one skilled in the art to make and use the invention without undue experimentation.

The applicant's disclosure on the other hand fails to describe the nature of any of the signals exchanged between circuits, any synchronization whatsoever, how those signals are derived, and how they are used in subsequent processing as fully described above. In order to further exemplify this, the examiner points to the applicant's figure 5A, which is similar to the figures of Billing, as follows:

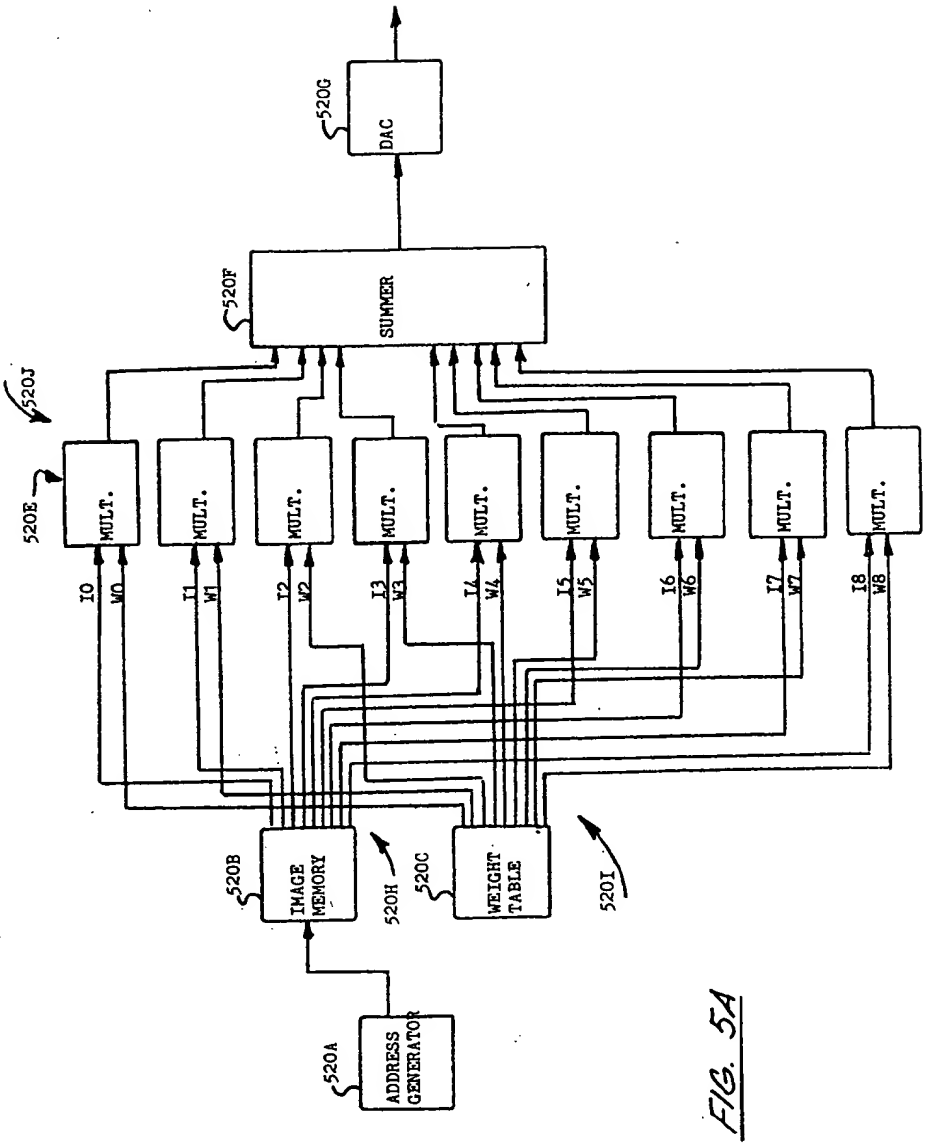



FIG. 5A

**Office Action Figure D – Applicant's Figure 5A**

This figures is described in the applicant's specification at pages 161-163. Figure 5A depicts an "address generator" block connected to an "image memory", which is connected to various multipliers, a summer and a DAC. Figure 5A also depicts a

"weight table" connected to the multipliers. However, the description ends there. In stark contrast to Billing, the applicant's figure 5A does not describe the function of the address generator, the nature of the signals emanating from the address generator, how it controls the "image memory", or how the "weight table" and the "image memory" are used in the subsequent multiplications, etc. Specification pages 161-163 which describe this figure completely fail to remedy this deficiency. Nothing in these pages describes anything related to the signal format and/or synchronization between the blocks of figure 5A. Little to not guidance is provided to enable one skilled in the art to make and use the invention without undue experimentation. While this is just one example, a similar analysis of any of the applicant's figures and corresponding portions of the specification reveals the exact same deficiencies.

It is the examiner's contention that at least a minimal disclosure of the claimed system, including the nature of the signals passing between circuits/processors, synchronization of processing, how the signals are created, and how they are used in subsequent processing would have been required in June of 1995 in order to enable one skill in the art to make and use the applicant's claimed invention without undue experimentation. Billing is evidence of this. However, no such details are provide in the applicant's disclosure, leaving one skill in the art with virtually no guidance whatsoever, and it is the examiner's contention that undue and unreasonable experimentation would have been required even in June of 1995 to make and use the claimed invention.

Summary

Because of the deficiencies in the original disclosure, undue and unreasonable experimentation and delay would be required for one skilled in the art to make and use the claimed invention. The examiner has come to this conclusion based on the culmination and preponderance of evidence as outlined above. The deficiencies have nothing to do with the lack of a corresponding written description. Rather, the claims define an interconnected and interrelated system of disparate and complex image processing elements, interacting to produce results wholly dependent on the claimed combination (i.e., the claimed interrelations). In order to make and use the invention, one skilled in the art would turn to the specification and drawings to provide some guidance for connecting and interfacing the elements. However, the drawings and specification describe broad individual image processing assemblages (i.e., "modules") by generic name and overall function. The specification is completely devoid of any input-output characteristics, control, decision-making or timing required between the modules in order for the individual elements to function with one another; particularly to carry out the claimed invention where very disparate types of image processing elements must interact with one another (e.g., as diagramed in Office Action Figure A above). Based on the evidence provided by the examiner above, at least some such details (e.g., input-output characteristics, timing, decision-making and control) were needed for an enabling disclosure at the time the invention was filed; and even as of the most recent filing. No such details are to be found in the specification. The case law cited above supports this position. Even with the hardware, I/O characteristics, timing

and control deficiencies aside, the software burden of programming such an interconnected and interrelated system is an overwhelming task. Finally, looking at the very words used by the applicant to describe the invention, the specification appears to be an invitation to one skilled in the art to experiment extensively rather than to make and use a particular image processing system (e.g., a system corresponding to one of the claimed inventions). None of the applicant's disclosed experimental system "configurations" correspond to the claimed subject matter, and none discloses any input-output characteristics, timing, control or programming required to make and use the invention without undue experimentation. An enabling disclosure is lacking for at least these reasons.

The Burden has Shifted to the Applicant

"If the PTO meets this burden, the burden then shifts to the applicant to provide suitable proofs indicating that the specification is indeed enabling." In re Wright, 27 USPQ2d 1510, 1513. In the rejection advanced above, the examiner explained in detail why he believes the claims are not enabled by the description of the invention provided in the specification. The examiner's reasons were NOT merely naked allegations based on intuition and/or engineering experience. Rather, evidence in the form of US patents, non-patent literature and case law were relied upon and explained in support of the examiner's assertions; and the examiner has differentiated the enablement rejection from the lack of a written description. The examiner respectfully contends that a prima facie case has been met, and the burden has now shifted to the applicant.